Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Please **Amend** claims 24, 26-29, 31, 34 as follows:

1. (Previously Amended) An interferometer for measuring a surface shape of an optical element using an interference signal, said interferometer comprising a wave-front changing unit including an Alvarez lens pair, wherein a light which forms the interference signal passes the unit and said unit being able to change a wave-front of the light into plural shapes.

2. (Previously Amended) An interferometer according to claim 1, wherein said Alvarez lens pair changes a sixth-order or higher component of a moving radius of the wave-front.

3. (Previously Amended) An interferometer according to claim 1, wherein there are plural Alvarez lens pairs, the number of Alvarez lens pairs corresponding to the number of orders of a moving radius in the wave-front to be changed.

4. (Previously Amended) An interferometer according to claim 1, wherein said Alvarez lens changes a fourth-order or higher component of a moving radius of the wave-front.

5. (Previously Amended) An interferometer according to claim 1, wherein said wave-front changing unit variably changes a fourth-order or higher component of a moving radius of the wave-front.

6. (Previously Amended) An interferometer for measuring a surface shape of an optical element using an interference signal, said interferometer comprising a wave-front changing unit, wherein a light which forms the interference signal passes the unit and said unit variably changing a fourth-order or higher component of a moving radius of the wave-front.

7. (Previously Amended) An interferometer according to claim 6, wherein said wave-front changing unit includes a plurality of optical members, a position of each optical member being determined at such a position that aberration changed in said wave-front changing unit may be minimized.

8. (Previously Amended) An interferometer according to claim 6, wherein said

wave-front changing unit has a spherical aberration generating part.

9. (Original) An interferometer according to claim 8, wherein said spherical aberration generating mechanism has a plurality of lens members, and adjusts generation of aberration by adjusting a separation between two of the lens members.

10. (Original) An interferometer according to claim 8, wherein said spherical aberration generating mechanism has a plurality of lens members for serving as a parallel plane, said optical member being able to adjust a parallel plane.

11. (Previously Amended) An interferometer according to claim 6, wherein said wave-front changing unit includes an Alvarez lens pair.

12. (Previously Amended) An interferometer according to claim 6, wherein said wave-front changing unit includes:

a mobile part that may variably change the wave-front; and

a monitor part for monitoring positional information of said mobile part.

13. (Previously Amended) An interferometer according to claim 12, wherein said interferometer uses a moving amount of the mobile part obtained from the monitor part to calculate the wave-front to be changed and uses the calculated wave-front for the reference wave-front.

14. (Previously Amended) An interference measurement method for measuring a surface shape of an optical element using an interference signal, said method comprising the steps of:

changing a wave-front of a light which forms the interference signal as a measurement reference for the surface shape by using a reference wave-front changing unit including an Alvarez lens pair;

detecting the interference signal caused by light which passed the optical element; and

measuring the surface shape of the optical element on the basis of the detected interference signal.

15. (Previously Amended) A method according to claim 14, wherein said wave-front changing unit variably changes a fourth-order or higher component of a moving radius of

the wave-front.

16. (Previously Amended) An interference measurement method for measuring a surface shape of an optical element using an interference signal, said method comprising the steps of:

changing a wave-front of a light which forms the interference signal by using a wave-front changing unit for variably changing a fourth-order or higher component of a moving radius of the wave-front;

detecting the interference signal caused by light which passed the optical element; and

measuring the surface shape of the optical element on the basis of the detected interference signal.

17. (Previously Amended) A method according to claim 16, wherein said wave-front changing unit includes a plurality of optical members, a reference position of each optical member being determined at such a position that aberration changed in said wave-front changing unit may be minimized.

18. (Previously Amended) A method according to claim 16, wherein said wave-front changing unit includes a mobile part that may variably change the wave-front, and

wherein said changing step calculating a shape of the wave-front based on a moving amount obtained by monitoring positional information of the mobile part.

19. (Previously Amended) An exposure apparatus using an optical element manufactured by using an interferometer for measuring a surface shape of an optical element using an interference signal, the interferometer comprising a wave-front changing unit including an Alvarez lens pair, wherein a light which forms the interference signal passes the unit and said unit being able to change a wave-front of the light into plural.

20. (Previously Amended) An exposure apparatus using an optical element manufactured by using an interferometer for measuring a surface shape of an optical element using an interference signal, the interferometer comprising a wave-front changing unit, wherein a light which forms the interference signal passes the unit and said unit variably changing a fourth-order or higher component of a moving radius of the wave-front of the light.

21. (Previously Amended) An exposure apparatus using an optical element manufactured by using an interference measurement method for measuring a surface shape of an optical element using an interference signal, the method comprising the steps of changing a wave-front of a light which forms the interference signal by using a wave-front changing unit including an Alvarez lens pair, detecting the interference signal caused by light which passed the optical element, and measuring the surface shape of the optical element on the basis of the detected interference signal.

22. (Previously Amended) An exposure apparatus using an optical element manufactured by using an interference measurement method for measuring a surface shape of an optical element using an interference signal, the method comprising the steps of changing a wave-front of a light which forms the interference signal by using a wave-front changing unit for variably generating a fourth-order or higher component of a moving radius of the wave-front, detecting the interference signal caused by light which passed the optical element; and measuring the surface shape by interfering of the optical element on the basis of the detected interference signal.

23. (Previously Amended) An interferometer for measuring surface information of a target surface by interfering a wave-front from a reference mirror with a target wave-front from the target surface, said interferometer comprising a wave-front changing unit for changing a wave-front of the light causing interference, wherein said wave-front changing unit comprising:

a spherical aberration generating part for variably generating a spherical aberration; and

an Alvarez lens pair for variably changing a component of six or higher power of a moving radius of the wave-front.

24. (Currently Amended) An interference measurement method for measuring a surface shape of an optical element using interference, said method comprising the steps of:

dividing a measurement surface of the optical element into at least two segments; ~~and~~

interference-measuring each segment, wherein in measuring a surface shape, a wave-front ~~as a measurement reference~~ for a measurement of at least one segment is an

aspheric wave-front; and

an aspheric wave-front changing part approximately independently controllably forming each of fourth-order or higher components of a moving radius of the wave-front in the aspheric wave-front.

25. (Cancelled)

26. (Currently Amended) A method according to claim [[25]] 24, further comprising the steps of:

approximately independently controlling, in the aspheric wave-front, each of fourth-order or higher components of a moving radius of the wave-front; and

controlling curvature of a spherical component for each segment to be measured.

27. (Currently Amended) A method according to claim [[25]]24, wherein the aspheric wave-front ~~generating~~ changing part includes at least an Alvarez lens pair.

28. (Currently Amended) A method according to claim 27, wherein there is a one-to-one correspondence between the Alvarez lens pair in the aspheric wave-front ~~generating~~ changing part and a component to be independently controlled.

29. (Currently Amended) A method according to claim 28, wherein the aspheric wave-front ~~generating~~ changing part controls three components of fourth, sixth and eighth orders of the moving radius in the wave-front in the aspheric wave-front, and each component is approximately independently controlled by a corresponding Alvarez lens pair.

30. (Previously Amended) A method according to claim 29, wherein an aspheric surface amount controlled by the Alvarez lens pairs does not exceed 20 times wavelength of light used for the measurement.

31. (Currently Amended) An interference measurement method for measuring a surface shape of an optical element using interference, said method comprising the steps of:

dividing a measurement surface of the optical element into at least two segments; and

interference-measuring each segment,

wherein in measuring a surface shape, the measurement surface is divided into a plurality of segments according to a distance from an optical axis, and a wave-front ~~as a measurement reference~~ for a measurement of at least one segment is an aspheric wave-front, and

wherein the aspheric wave-front is approximately independently controlled in fourth order or higher components in a moving radius of the wave-front.

32. (Previously Amended) A method according to claim 31, wherein spherical components in the aspheric wave-front are different for each divided segment, an offset amount between the aspheric wave-front and a target surface in each segment does not exceed 10 times wavelength of light used for the measurement.

33. (Previously Amended) A method according to claim 31, wherein each of fourth order or higher components of a moving radius in the wave-front is approximately independently controlled by the Alvarez lens pairs, and an aspheric surface amount of each component does not exceed 20 times wavelength of light used for the measurement.

34. (Currently Amended) An exposure apparatus using an optical element manufactured by using an interference measurement method for measuring a surface shape of an optical element using interference, said method comprising the steps of:

dividing a measurement surface of the optical element into at least two segments, and interference-measuring each segment, wherein in measuring a surface shape, a wave-front ~~as a measurement reference~~, for a measurement of at least one segment is an aspheric wave-front, and an aspheric wave-front changing part approximately independently controllably forming each of fourth-order or higher components of a moving radius of the wave-front in the aspheric wave-front.

Please add new claim 35.

35. (New) An interferometer for measuring a surface shape of a target optical element using interference, said interferometer comprising:

a beam splitter for dividing light from a light source;

a reference mirror for reflecting one divided light;

a wave-front changing unit for changing a wave-front of another divided light into plural shapes, wherein the other divided light that has passed the wave-front unit is

directed to a surface of the target optical element; and

a light receiving element for receiving, as an interference signal, the one divided light reflected by the reference mirror and the other divided light from the target optical element.